fx-82TL
fx-83WA
fx-85W
fx-85WA
fx-270W PLUS
fx-300W
fx-350TL
fx-911W
User's Guide

U.S. Pat. 4,410,956
E

CASIO

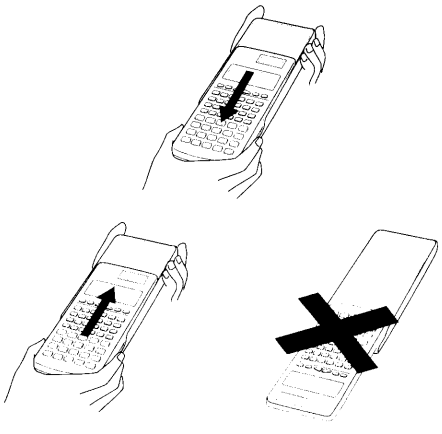
SA9911-A Printed in China
HA310973-1

Removing and Replacing the Calculator's Cover

• **To Remove the cover**
Grasp the top of the cover, and slide the unit out from the bottom.

• **To Replace the cover**
Grasp the top of the cover, and slide the unit in from the bottom.

Always slide the unit into the cover with the unit's display end first. Never slide the keyboard end of the unit into the cover.



Safety Precautions

Be sure to read the following safety precautions before using this calculator. Keep this manual handy for later reference.

⚠ Caution

This symbol is used to indicate information that can result in personal injury or material damage if ignored.

Batteries

- After removing the batteries from the calculator, put them in a safe place where there is no danger of

Handling Precautions

- **Be sure to press the P button on the back of the calculator before using it for the first time (fx-82TL/fx-83WA/fx-270W PLUS/fx-350TL).**
- **Be sure to press the [ON] key before using the calculator for the first time (fx-85W/fx-85WA/fx-300W/fx-911W).**
- **Even if the calculator is operating normally, replace the battery at least once every three years for the fx-83WA/fx-85W/fx-85WA/fx-270W PLUS/fx-300W/fx-350TL/fx-911W, or at least once every two years for the fx-82TL.**
  Dead battery can leak, causing damage to and malfunction of the calculator. Never leave the dead battery in the calculator.
- **The battery that comes with this unit discharges slightly during shipment and storage. Because of this, it may require replacement sooner than the normal expected battery life.**
- **Low battery power can cause memory contents to become corrupted or lost completely. Always keep written records of all important data.**
- **Avoid use and storage in areas subjected to temperature extremes.**
  Very low temperatures can cause slow display response, total failure of the display, and shortening of battery life. Also avoid leaving the calculator in direct sunlight, near a window, near a heater or anywhere else it might become exposed to very high temperatures. Heat can cause discoloration or deformation of the calculator's case, and damage to internal circuitry.
- **Avoid use and storage in areas subjected to large amounts of humidity and dust.**
  Take care never to leave the calculator where it might be splashed by water or exposed to large amounts of humidity or dust. Such elements can damage internal circuitry.
- **Never drop the calculator or otherwise subject it to strong impact.**
- **Never twist or bend the calculator.**
  Avoid carrying the calculator in the pocket of your trousers or other tight-fitting clothing where it might be subjected to twisting or bending.
- **Never try to take the calculator apart.**
- **Never press the keys of the calculator with a ball-point pen or other pointed object.**
- **Use a soft, dry cloth to clean the exterior of the unit.**
  If the calculator becomes very dirty, wipe it off with a cloth moistened in a weak solution of water and a mild neutral household detergent. Wring out all excess moisture before wiping the calculator. Never use thinner, benzine or other volatile agents to clean the calculator. Doing so can remove printed markings and damage the case.

Two-line Display

You can simultaneously check the calculation formula and its answer.

The first line displays the calculation formula.
The second line displays the answer.

Before Starting Calculations...

■ Modes

Application	Mode Name	Mode Indicator
Calculation Modes		
Normal calculations	COMP	–
Standard deviation calculations	SD	SD
Regression calculations	REG	REG
Base-*n* calculations (fx-85W only)	BASE-N	b (binary) o (octal) d (decimal) H (hexade
Angle Unit Modes		
Degrees	DEG	
Radians	RAD	
Grads	GRA	
Display Modes		
Exponential notation (Canceling FIX and SCI specification)	NORM1 NORM2	

■ Replay Function

- Pressing [▶] or [◀] recalls the last calculation yo formed. You can then make any changes you want calculation and re-execute it.
- Pressing [AC] does not clear Replay memory, so yo recall the last calculation even after you press [AC]
- Replay memory is cleared whenever you start calculation, change to another mode, or turn off p

■ Error Locator

- Pressing [▶] or [◀] after an error occurs displays th culation with the cursor positioned at the location the error occurred.

■ Exponential Display Formats

This calculator can display up to 10 digits. Larger are automatically displayed using exponential notat the case of decimal values, you can select betwee formats that determine at what point exponential no is used. Press [MODE] [MODE] [MODE] [MODE] [3] [1] (or [2]) to select N 1 or NORM 2 (fx-85W). For other models, press [MODE] [3] [1] (or [2]).

• **NORM 1**
With NORM 1, exponential notation is automatically for integer values with more than 10 digits and de values with more than two decimal places.

• **NORM 2**
With NORM 2, exponential notation is automatically for integer values with more than 10 digits and de values with more than nine decimal places.

- All of the examples in this manual show calculati sults using the NORM 1 format.

■ Answer Memory

- Whenever you press [=] after inputting values or pression, the calculated result is automatically sto Answer Memory. You can recall Answer Memory co by pressing [Ans].
- Answer Memory can store up to 12 digits for the ma and two digits for the exponent.
- Answer Memory contents are not changed if the tion performed by any of the above key operatio sults in an error.

Basic Calculations

- Use the COMP mode for basic calculations.
- **Example 1:** $3\times(5\times10^{-9})$

  [3] [×] [(] [5] [EXP] [(−)] [9] [)] [=]

- **Example 2:** $5\times(9+7)$

  [5] [×] [(] [9] [+] [7] [)] [=]

- You can skip all [)] operations before [=].

Memory Calculations

■ Independent Memory

- Values can be input directly into memory, add memory, or subtracted from memory. Indepe memory is convenient for calculating cumulative t
- Independent memory uses the same memory ar variable M.
- To clear independent memory (M), input [0] [STO] [M

- **Example:**

23 + 9 = 32	23 [+] 9 [STO] [M]	
53 − 6 = 47	53 [−] 6 [M+]	
−) 45 × 2 = 90	45 [×] 2 [SHIFT] [M−]	
(Total) −11	[RCL] [M]	−11

■ Variables

- There are nine variables (A through F, M, X and Y), v can be used to store data, constants, results, and values.
- Use the following operation to delete data assigned nine variables: [SHIFT] [Mcl] [=].
- Use the following operation to delete data assigned particular variable: [0] [STO] [A]. This operation delete data assigned to variable A.

Example: 193.2
193.
193.2
8
=
6

eplay Function

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RM 1

NORM 1, exponential notation is automatically used teger values with more than 10 digits and decimal s with more than two decimal places.

RM 2

NORM 2, exponential notation is automatically used teger values with more than 10 digits and decimal s with more than nine decimal places.

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sic Calculations

the COMP mode for basic calculations.

mple 1: $3\times(5\times10^{-9})$

3 × (5 EXP (−) 9) = 1.5^-08

mple 2: $5\times(9+7)$

5 × (9 + 7) = 80.

can skip all) operations before =.

emory Calculations

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mple: 193.2 ÷ 23 = 8.4
193.2 ÷ 28 = 6.9

193.2 STO A ÷ 23 = 8.4

ALPHA A ÷ 28 = 6.9

Percentage Calculations

- Use the COMP mode for percentage calculations.
- **Example 1:** To calculate 12% of 1500

1500 × 12 SHIFT % = 180.

- **Example 2:** To calculate what percentage of 880 is 660

660 ÷ 880 SHIFT % = 75.

- **Example 3:** To add 15% onto 2500

2500 × 15 SHIFT % + = 2875.

- **Example 4:** To discount 3500 by 25%

3500 × 25 SHIFT % − = 2625.

- **Example 5:** If 300 grams are added to a test sample originally weighing 500 grams, what is the percentage increase in weight?

$\frac{300+500}{500}\times100=160\ (\%)$

300 + 500 SHIFT % = 160.

- **Example 6:** If temperature changes from 40 C to 46 C, what percentage did it rise?

$\frac{46-40}{40}\times100=15\ (\%)$

46 − 40 SHIFT % = 15.

Scientific Function Calculations

- Use the COMP mode for scientific function calculations.
- $\pi = 3.14159265359$

■ Trigonometric/Inverse Trigonometric Functions

- **Example 1:** sin63 52′41″

fx-85W: MODE MODE MODE 1 → "D"
Other models: MODE MODE 1

sin 63 ° ′ ″ 52 ° ′ ″ 41 ° ′ ″ = 0.897859012 D

- **Example 2:** $\cos\left(\frac{\pi}{3}\text{ rad}\right)$

fx-85W: MODE MODE MODE 2 → "R"
Other models: MODE MODE 2

cos (SHIFT π ÷ 3) = 0.5 R

- **Example 3:** $\cos^{-1}\frac{\sqrt{2}}{2}=\frac{\pi}{4}\text{ rad}$

fx-85W: MODE MODE MODE 2 → "R"
Other models: MODE MODE 2

SHIFT cos (√ 2 ÷ 2) = 0.785398163 R

Ans ÷ SHIFT π = 0.25

- **Example 4:** $\tan^{-1}0.741$

fx-85W: MODE MODE MODE 1 → "D"
Other models: MODE MODE 1

SHIFT tan 0.741 = 36.53844577 D

■ Hyperbolic/Inverse Hyperbolic Functions

- **Example 1:** sinh 3.6

hyp sin 3.6 = 18.28545536

- **Example 2:** $\sinh^{-1}30$

hyp SHIFT sin 30 = 4.094622224

■ Angle Unit Conversion

- Press SHIFT DRG▸ to display the following menu.

D R G
1 2 3

- Pressing 1, 2, or 3 converts the displayed value to the corresponding angle unit.
- **Example :** To convert 4.25 radians to degrees

fx-85W: MODE MODE MODE 1 → "D"
Other models: MODE MODE 1

4.25 SHIFT DRG▸ 2 (R) = 4.25r 243.5070629

■ Common and Natural Logarithms/

- **Example 6:** $\frac{1}{\frac{1}{3}-\frac{1}{4}}$

(1 a b/c 3 − 1 a b/c 4) a b/c = 12.

- **Example 7:** 8! 8 SHIFT x! = 40320.
- **Example 8:** To generate a random number between 0.000 and 0.999

SHIFT Ran# = 0.664
Example (results differ each time)

- **Example 9:** 3π 3 SHIFT π = 9.424777961

■ FIX, SCI, RND

- **Example 1:** 200÷7×14=400

200 ÷ 7 × 14 = 400.

(Specifies three decimal places.)
fx-85W: SHIFT MODE MODE MODE 1 3
Other models: SHIFT MODE MODE 1 3 = 400.000 Fix

(Calculation continues using 10 display digits)
200 ÷ 7 = 28.571
× 14 = 400.000

Performing the same calculation using the specified number of decimal places

200 ÷ 7 = 28.571

(Internal rounding) SHIFT Rnd = 28.571

× 14 = 399.994

- Press MODE MODE MODE MODE 3 1 (fx-85W) to clear FIX specification. For other models, press MODE MODE MODE 3 1.

- **Example 2:** 1 ÷ 3, displaying result with two significant digits (SCI 2)

fx-85W: MODE MODE MODE MODE 2 2
Other models: MODE MODE MODE 2 2

1 ÷ 3 = 3.3^-01 Sci

- Press MODE MODE MODE MODE 3 1 (fx-85W) to clear SCI specification. For other models, press MODE MODE MODE 3 1.

■ ENG Calculations

- Example 1: To convert 56,088 meters to kilometers

56088 = ENG 56.088 03

- **Example 2:** To convert 0.08125 grams to milligrams

0.08125 = ENG 81.25 -03

■ Coordinate Conversion (Pol(x, y), Rec (r, θ))

- Calculation results are automatically assigned to variables E and F.
- **Example 1:** To convert polar coordinates (r=2, θ=60°) to rectangular coordinates (x, y) (DEG mode)

x: SHIFT Rec(2 , 60) = 1. D
y: RCL F = 1.732050808

- RCL E, RCL F swaps displayed value with value in memory.
- **Example 2:** To convert rectangular coordinates (1, √3) to polar coordinates (r, θ) (RAD mode)

r: Pol(1 , √ 3) = 2. R
θ: RCL F = 1.047197551

- RCL E, RCL F swaps displayed value with value in memory.

■ Permutation

- **Example:** To determine how many different 4-digit values can be produced using the numbers 1 through 7
  - Numbers cannot be duplicated within the same 4-digit value (1234 is allowed, but 1123 is not).

7 SHIFT nPr 4 = 840.

■ Combination

• To Remove the cover
Grasp the top of the cover, and slide the unit out from the bottom.

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Grasp the top of the cover, and slide the unit in from the bottom.

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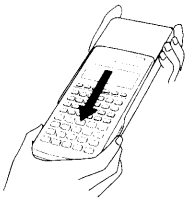

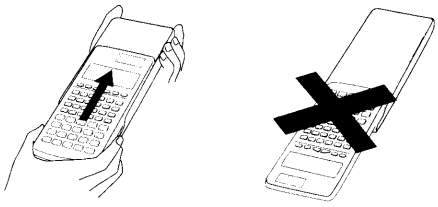

Safety Precautions

Be sure to read the following safety precautions before using this calculator. Keep this manual handy for later reference.

⚠ Caution

This symbol is used to indicate information that can result in personal injury or material damage if ignored.

Batteries

- After removing the batteries from the calculator, put them in a safe place where there is no danger of them getting into the hands of small children and accidently swallowed.
- Keep batteries out of the reach of small children. If accidently swallowed, consult with a physician immediately.
- Never charge batteries, try to take batteries apart, or allow batteries to become shorted. Never expose batteries to direct heat or dispose of them by incineration.
- Misuse of batteries can cause them to leak acid that can cause damage to nearby items and creates the possibility of fire and personal injury.
  - Always make sure that a battery's positive ⊕ and negative ⊖ sides are facing correctly when you load it into the calculator.
  - Remove the batteries if you do not plan to use the calculator for a long time.
  - Use only the type of batteries specified for this calculator in this manual.

Disposing of the Calculator

- Never dispose of the calculator by burning it. Doing so can cause certain components to suddenly burst, creating the danger of fire and personal injury.
- The displays and illustrations (such as key markings) shown in this User's Guide are for illustrative purposes only, and may differ somewhat from the actual items they represent.
- The contents of this manual are subject to change without notice.
- In no event shall CASIO Computer Co., Ltd. be liable to anyone for special, collateral, incidental, or consequential damages in connection with or arising out of the purchase or use of these materials. Moreover, CASIO Computer Co., Ltd. shall not be liable for any claim of any kind whatsoever against the use of these materials by any other party.

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Two-line Display

You can simultaneously check the calculation formula and its answer.

The first line displays the calculation formula.
The second line displays the answer.

Before Starting Calculations...

■ Modes

Application	Mode Name	Mode Indicator
Calculation Modes		
Normal calculations	COMP	–
Standard deviation calculations	SD	SD
Regression calculations	REG	REG
Base-*n* calculations (fx-85W only)	BASE-N	b (binary) o (octal) d (decimal) H (hexadecimal)
Angle Unit Modes		
Degrees	DEG	D
Radians	RAD	R
Grads	GRA	G
Display Modes		
Exponential notation (Canceling FIX and SCI specification)	NORM1 NORM2	– –
Number of decimal place specification	FIX	Fix
Number of significant digit specification	SCI	Sci

Note!

- Mode indicators appear in the lower part of the display, except for the Base-*n* indicators which appear in the exponent part of the display.
- You cannot set the angle unit or the display mode while the calculator is in the BASE-N mode (fx-85W).
- The COMP, SD, and REG modes can be used in combination with the angle unit modes.
- Be sure to check the current calculation mode (SD, REG, COMP) and angle unit mode (DEG, RAD, GRA) before beginning a calculation.

■ Input Capacity

- The memory area used for calculation input can hold 79 "steps." Whenever you input the 73rd step of any calculation, the cursor changes from "_" to "■" to let you know memory is running low. If you still need to input more, you should divide your calculation into two or more parts.

■ Making Corrections During Input

- Use ◀ and ▶ to move the cursor to the location you want.
- Press DEL to delete the number or function at the current cursor position.
- Press SHIFT INS to change to an insert cursor [ ]. Inputting something while the insert cursor is on the display inserts the input at the insert cursor position.
- Press ◀, ▶, SHIFT INS, or = returns to the normal cursor from the insert cursor.

- Use the COMP mode for basic calculations.
- **Example 1:** $3\times(5\times10^{9})$

  3 × (5 EXP (−) 9) = → 1.5

- **Example 2:** $5\times(9+7)$

  5 × (9 + 7) = → 80.

- You can skip all) operations before =.

Memory Calculations

■ Independent Memory

- Values can be input directly into memory, added t memory, or subtracted from memory. Independe memory is convenient for calculating cumulative totals
- Independent memory uses the same memory area a variable M.
- To clear independent memory (M), input 0 STO M.

- **Example:**

  23 + 9 = 32
  53 − 6 = 47
  −) 45 × 2 = 90
  (Total) −11

  23 + 9 STO M → 32.
  53 − 6 M+ → 47.
  45 × 2 SHIFT M− → 90.
  RCL M → −11.

■ Variables

- There are nine variables (A through F, M, X and Y), whi can be used to store data, constants, results, and oth values.
- Use the following operation to delete data assigned to nine variables: SHIFT Mcl =.
- Use the following operation to delete data assigned t particular variable: 0 STO A. This operation deletes t data assigned to variable A.

- **Example:** 193.2 ÷ 23 = 8.4
  193.2 ÷ 28 = 6.9

  193.2 STO A ÷ 23 = → 8.4
  ALPHA A ÷ 28 = → 6.9

Fraction Calculations

■ Fraction Calculations

- Use the COMP mode for fraction calculations.
- Values are automatically displayed in decimal forn whenever the total number of digits of a fractional va (integer + numerator + denominator + separator mar exceeds 10.

- **Example 1:** $\frac{2}{3}+1\frac{4}{5}$

  2 $a^{b/c}$ 3 + 1 $a^{b/c}$ 4 $a^{b/c}$ 5 = → 2⌟7⌟15

- **Example 2:** $\frac{1}{2}+1.6$

  1 $a^{b/c}$ 2 + 1.6 = → 2.1

- Fraction/decimal calculation results are always decir

■ Decimal-to-Fraction Conversion

- **Example:** $2.75 \rightarrow 2\frac{3}{4}$

  2.75 = → 2.75
  $a^{b/c}$ → 2⌟3⌟4
  SHIFT d/c → 11⌟4

■ Fraction-to-Decimal Conversion

- **Example:** $\frac{1}{2} \leftrightarrow 0.5$ (Fraction ↔ Decimal)

  1 $a^{b/c}$ 2 = → 1⌟2
  $a^{b/c}$ → 0.5
  $a^{b/c}$ → 1⌟2

e the COMP mode for basic calculations.

ample 1: $3\times(5\times10^{9})$

3 × (5 EXP (−) 9) = | 1.5^09

ample 2: $5\times(9+7)$

5 × (9 + 7) = | 80.

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emory Calculations

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45 × 2 = 90	45 × 2 SHIFT M−	90.
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raction Calculations

raction Calculations

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ample 1: $\frac{2}{3}+1\frac{4}{5}$

2 $a^{b/c}$ 3 + 1 $a^{b/c}$ 4 $a^{b/c}$ 5 = | 2⌟7⌟15.

ample 2: $\frac{1}{2}+1.6$

1 $a^{b/c}$ 2 + 1.6 = | 2.1

ction/decimal calculation results are always decimal.

ecimal-to-Fraction Conversion

ample: $2.75\rightarrow2\frac{3}{4}$

2.75 = | 2.75

$a^{b/c}$ | 2⌟3⌟4.

SHIFT d/c | 11⌟4.

raction-to-Decimal Conversion

ample: $\frac{1}{2}\leftrightarrow0.5$ (Fraction ↔ Decimal)

1 $a^{b/c}$ 2 = | 1⌟2.

$a^{b/c}$ | 0.5

$a^{b/c}$ | 1⌟2.

fx-85W: MODE MODE MODE 2
Other models: MODE MODE 2 → "R"

cos (SHIFT π ÷ 3) = | 0.5 R

- **Example 3:** $\cos^{-1}\frac{\sqrt{2}}{2}=\frac{\pi}{4}$ rad

fx-85W: MODE MODE MODE 2
Other models: MODE MODE 2 → "R"

SHIFT cos (√ 2 ÷ 2) = | 0.785398163 R

Ans ÷ SHIFT π = | 0.25

- **Example 4:** $\tan^{-1}0.741$

fx-85W: MODE MODE MODE 1
Other models: MODE MODE 1 → "D"

SHIFT tan 0.741 = | 36.53844577 D

■ Hyperbolic/Inverse Hyperbolic Functions

- **Example 1:** sinh 3.6

hyp sin 3.6 = | 18.28545536

- **Example 2:** $\sinh^{-1}30$

hyp SHIFT sin 30 = | 4.094622224

■ Angle Unit Conversion

- Press SHIFT DRG▶ to display the following menu.

D	R	G
1	2	3

- Pressing 1, 2, or 3 converts the displayed value to the corresponding angle unit.
- **Example :** To convert 4.25 radians to degrees

fx-85W: MODE MODE MODE 1 → "D"
Other models: MODE MODE 1

4.25 SHIFT DRG▶ 2 (R) = | 4.25r / 243.5070629

■ Common and Natural Logarithms/ Antilogarithms

- **Example 1:** log 1.23 log 1.23 = | 0.089905111
- **Example 2:** ln 90 ($=\log_e 90$)

ln 90 = | 4.49980967

- **Example 3:** e^{10} SHIFT e^x 10 = | 22026.46579
- **Example 4:** $10^{1.5}$ SHIFT 10^x 1.5 = | 31.6227766
- **Example 5:** 2^4 2 ^ 4 = | 16.

■ Square Roots, Cube Roots, Roots, Squares, Cubes, Reciprocals, Factorials, Random Numbers and π

- **Example 1:** $\sqrt{2}+\sqrt{3\times5}$

√ 2 + √ 3 × 5 = | 5.287196909

- **Example 2:** $\sqrt[3]{5}+\sqrt[3]{-27}$

√ 5 + √ (−) 27 = | −1.290024053

- **Example 3:** $\sqrt[7]{123}$ $(=123^{\frac{1}{7}})$

7 SHIFT √ 123 = | 1.988647795

- **Example 4:** $123+30^2$

123 + 30 ^ 2 = | 1023.

- **Example 5:** 12^3 12 ^ 3 = | 1728.

tification. For other models, press MODE MODE MODE 3 1.

■ ENG Calculations

- Example 1: To convert 56,088 meters to kilometers

56088 = ENG | 56.088^03

- **Example 2:** To convert 0.08125 grams to milligrams

0.08125 = ENG | 81.25^−03

■ Coordinate Conversion (Pol(x, y), Rec (r, θ))

- Calculation results are automatically assigned to variables E and F.
- **Example 1:** To convert polar coordinates (r=2, θ=60°) to rectangular coordinates (x, y) (DEG mode)

x: SHIFT Rec 2 , 60) = | 1. D

y: RCL F | 1.732050808

- RCL E, RCL F swaps displayed value with value in memory.
- **Example 2:** To convert rectangular coordinates (1, √3) to polar coordinates (r, θ) (RAD mode)

r: Pol 1 , √ 3) = | 2. R

θ: RCL F | 1.047197551

- RCL E, RCL F swaps displayed value with value in memory.

■ Permutation

- **Example:** To determine how many different 4-digit values can be produced using the numbers 1 through 7
  - Numbers cannot be duplicated within the same 4-digit value (1234 is allowed, but 1123 is not).

7 SHIFT $_7P_4$ 4 = | 840.

■ Combination

- **Example:** To determine how many different 4-member groups can be organized in a group of 10 individuals

10 $_{10}C_4$ 4 = | 210.
(fx-85W: SHIFT $_{10}C_4$)

Statistical Calculations

■ Standard Deviation (SD Mode)

- Press MODE MODE 1 (fx-85W) to enter the SD Mode for statistical calculations using standard deviation. For other models, press MODE 2.
- Data input always starts with SHIFT Scl = to clear statistical memory.
- Input data is used to calculate values for n, Σx, Σx^2, $\bar{x}$, σ_n and σ_{n-1} which you can recall using the key operations noted nearby.

RCL A	Σx^2
RCL B	Σx
RCL C	n
SHIFT 1	$\bar{x}$
SHIFT 2	σ_n
SHIFT 3	σ_{n-1}

- **Example:** To calculate σ_{n-1}, σ_n, $\bar{x}$, n, Σx, and Σx^2 for the following data : 55, 54, 51, 55, 53, 53, 54, 52

Enter SD Mode
fx-85W: MODE MODE 1
Other models: MODE 2

SHIFT Scl = (Memory Clear)
55 DT 54 DT 51 DT 55 DT
53 DT DT 54 DT 52 DT | 52. n

(Sample Standard Deviation σ_{n-1}) SHIFT 3 = | 1.407885953

(Population Standard Deviation σ_n) [SHIFT] [$x\sigma_n$] [=] 1.316956719

(Arithmetic Mean $\bar{x}$) [SHIFT] [$\bar{x}$] [=] 53.375

(Number of Data n) [RCL] [C] 8.

(Sum of Values Σx) [RCL] [B] 427.

(Sum of Squares of Values Σx^2) [RCL] [A] 22805.

Data Input Precautions

- [DT] [DT] inputs the same data twice.
- You can also input multiple entries of the same data using [SHIFT] [:]. To input the data 110 ten times, for example, press 110 [SHIFT] [:] 10 [DT].
- The above results can be obtained in any order, and not necessarily that shown above.
- To delete data you have just input, press [SHIFT] [CL].

■ Regression Calculations (REG Mode)

- Press [MODE] [MODE] [2] (fx-85W) to enter the REG mode and then select one of the following regression types. For other models, press [MODE] [3].

  [1]: Linear regression
  [2]: Logarithmic regression
  [3]: Exponential regression
  [▶] [1]: Power regression
  [▶] [2]: Inverse regression
  [▶] [3]: Quadratic regression

- Data input always starts with [SHIFT] [Scl] [=] to clear statistical memory.
- The values produced by a regression calculation depend on the values input, and results can be recalled using the key operations shown in the table below.

[RCL] [A]	Σx^2	[SHIFT] [$x\sigma_{n-1}$]	$x\sigma_{n-1}$
[RCL] [B]	Σx	[SHIFT] [$\bar{x}$]	$\bar{x}$
[RCL] [C]	n	[SHIFT] [$x\sigma_n$]	$x\sigma_n$
[RCL] [D]	Σy^2	[SHIFT] [$y\sigma_{n-1}$]	$y\sigma_{n-1}$
[RCL] [E]	Σy	[SHIFT] [A]	Regression coefficient A
[RCL] [F]	Σxy	[SHIFT] [B]	Regression coefficient B
[RCL] [M]	Σx^3	[SHIFT] [C]	Regression coefficient C
[RCL] [X]	Σx^2y	[SHIFT] [r]	Correlation coefficient r
[RCL] [Y]	Σx^4	[SHIFT] [$\hat{x}$]	$\hat{x}$
[SHIFT] [$\bar{x}$]	$\bar{x}$	[SHIFT] [$\hat{y}$]	$\hat{y}$
[SHIFT] [$x\sigma_n$]	$x\sigma_n$		

• Linear Regression

The regression formula for linear regression is: $y = A + Bx$.

• Example: Atmospheric Pressure vs. Temperature

Temperature	Atmospheric Pressure
10°C	1003 hPa
15°C	1005 hPa
20°C	1010 hPa
25°C	1011 hPa
30°C	1014 hPa

Perform linear regression to determine the regression formula terms and correlation coefficient for the data nearby. Next, use the regression formula to estimate atmospheric pressure at 18°C and temperature at 1000 hPa.

Enter REG Mode (Linear Regression)

fx-85W: [MODE] [MODE] [2] [1]
Other models: [MODE] [3] [1]
[SHIFT] [Scl] [=] (Memory Clear)

10 [,] 1003 [DT] 15 [,] 1005 [DT]
20 [,] 1010 [DT] 25 [,] 1011 [DT]
30 [,] 1014 [DT] 30. REG

(Regression Coefficient A) [SHIFT] [A] [=] 997.4

(Regression Coefficient B) [SHIFT] [B] [=] 0.56

(Correlation Coefficient r) [SHIFT] [r] [=] 0.982607368

(Atmospheric Pressure at 18°C) 18 [SHIFT] [$\bar{x}$] 1007.48

(Temperature at 1000 hPa) 1000 [SHIFT] [$\bar{x}$] 4.642857143

• Quadratic Regression

- The regression formula for quadratic regression is: $y = A + Bx + Cx^2$.
- Input data using the following key sequence.
  <x-data> [,] <y-data> [DT]

• Example:

x_i	y_i
29	1.6
50	23.5
74	38.0
103	46.4
118	48.0

Perform quadratic regression to determine the regression formula terms and correlation coefficient for the data nearby. Next, use the regression formula to estimate the values for $\hat{y}$ (estimated value of y) for $x_i = 16$ and $\hat{x}$ (estimated value of x) for $y_i = 20$.

Enter REG mode (Quadratic regression)

fx-85W: [MODE] [MODE] [2] [▶] [3]
Other models: [MODE] [3] [▶] [3]

• Example: To save the following formula, recall it, and then use it to calculate a result: $Y = X^2 + 3X - 12$

Input the formula.

[ALPHA] [Y] [ALPHA] [=] [ALPHA] [X] [x²] [+] 3 [ALPHA] [X] [−] 12 Y=X²+3X−12_ 0.

Store it in memory. [CALC] X? 0.

Input a value for its variable. 7 [=] 58.

[=] X? 7.

8 [=] 76.

- Formula memory is cleared whenever you start a new calculation, change to another mode, or turn off power.

Base-n Calculations (fx-85W)

- In addition to decimal values, calculations can be performed using binary, octal and hexadecimal values.
- You can specify the default number system to be applied to all input and displayed values, and the number system for individual values you input.
- You cannot use scientific functions in binary, octal, decimal, and hexadecimal calculations. You cannot input values that include decimal part and an exponent.
- If you input a value that includes a decimal part, the unit automatically cuts off the decimal part.
- Negative binary, octal, and hexadecimal values are produced by taking the two's complement.
- You can use the following logical operators between values in Base-n calculations: and (logical product), or (logical sum), xor (exclusive logical sum), xnor (exclusive logical sum negation), Not (negation), and Neg (minus).
- The following are the allowable ranges for each of the available number systems.

Binary	$1000000000 \leqq x \leqq 1111111111$
	$0 \leqq x \leqq 0111111111$
Octal	$4000000000 \leqq x \leqq 7777777777$
	$0 \leqq x \leqq 3777777777$
Decimal	$-2147483648 \leqq x \leqq 2147483647$
Hexadecimal	$80000000 \leqq x \leqq$ FFFFFFFF
	$0 \leqq x \leqq$ 7FFFFFFF

• Example 1: To perform the following calculation and produce a binary result:

$10111_2 + 11010_2$
Binary mode [MODE] [2] [BIN] 0. b

10111_2 [+] 11010_2 0. b

[=] 110001. b

• Example 2: To perform the following calculation and produce an octal result:

$7654_8 \div 12_{10}$
Octal mode [MODE] [2] [OCT] 0. o

[LOGIC] [LOGIC] [LOGIC] [4] (o) 7654_8 [÷]
[LOGIC] [LOGIC] [LOGIC] [1] (d)12_{10} 0. o

[=] 516. o

• Example 3: To perform the following calculation and produce a hexadecimal result:

120_{16} or 1101_2
Hexadecimal mode [MODE] [2] [HEX] 0. H

120_{16} [LOGIC] [2] (or)
[LOGIC] [LOGIC] [LOGIC] [3] (b)1101_2 0. H

[=] 12d. H

Degrees, Minutes, Seconds Calculations

- You can perform sexagesimal calculations using degrees (hours), minutes, and seconds, and convert between sexagesimal and decimal values.

• Example 1: To convert the decimal value 2.258 to a sexagesimal value

2.258 [=] 2.258

[SHIFT] [,,,] 2°15'28.8

• Example 2: To perform the following calculation:

12°34'56" × 3.45

12 [,,,] 34 [,,,] 56 [,,,] [×] 3.45 0.

[=] 43°24'31.2

Technical Information

- Attempt to perform a function calculation using a v that exceeds the allowable input range.
- Attempt to perform an illogical operation (divisic zero, etc.).

• Action

- Check your input values and make sure they ar within the allowable ranges. Pay special attenti values in any memory areas you are using.

Stk ERROR

• Cause

- Capacity of the numeric stack or operator stack ceeded.

• Action

- Simplify the calculation. The numeric stack ha levels and the operator stack has 24 levels.
- Divide your calculation into two or more separate

Syn ERROR

• Cause

- Attempt to perform an illegal mathematical oper

• Action

- Press [◀] or [▶] to display the calculation wit cursor located at the location of the error. Make essary corrections.

Arg ERROR

• Cause

- Improper use of argument

• Action

- Press [◀] or [▶] to display the location of the cau the error and make required corrections.

■ Order of Operations

Calculations are performed in the following order o edence.

1. Coordinate transformation: Pol (x, y), Rec (r, θ)
2. Type A functions:
   With these functions, the value is entered and th function key is pressed.
   x^2, x^{-1}, $x!$, °'"
3. Powers and roots: x^y, $\sqrt[x]{}$
4. $a^b/_c$
5. Abbreviated multiplication format in front of π, m name, or variable name: 2π, 5A, πA etc.
6. Type B functions:
   With these functions, the function key is press then the value is entered.
   $\sqrt{}$, $\sqrt[3]{}$, log, ln, e^x, 10^x, sin, cos, tan, $\sin^{-1}$, $\tan^{-1}$, sinh, cosh, tanh, $\sinh^{-1}$, $\cosh^{-1}$, $\tanh^{-1}$,
7. Abbreviated multiplication format in front of functions: 2√3, Alog2 etc.
8. Permutation and combination: $_nP_r$, $_nC_r$
9. ×, ÷
10. +, −

* Operations of the same precedence are performe right to left. e^xln √ 120 → e^x{ln(√ 120)}
Other operations are performed from left to right
* Operations enclosed in parentheses are perform

■ Stacks

This calculator uses memory areas, called "stacks," porarily store values (numeric stack) and command mand stack) according to their precedence during lations. The numeric stack has 10 levels and the co stack has 24 levels. A stack error (Stk ERROR) whenever you try to perform a calculation that is s plex that the capacity of a stack is exceeded.

■ Power Supply

The type of battery you should use depends on the number of your calculator.

<fx-85W/fx-85WA/fx-300W/fx-911W>

The TWO WAY POWER system actually has two supplies: a solar cell and a G13 Type (LR44) butt tery. Normally, calculators equipped with a solar cel can operate only when relatively bright light is p The TWO WAY POWER system, however, lets yo tinue to use the calculator as long as there is enou to read the display.

• Replacing the Battery

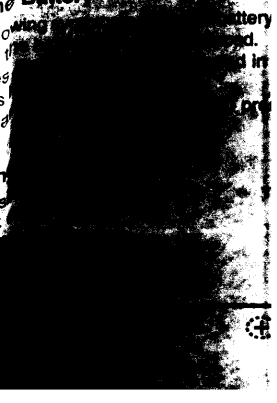
Either of the follo is low, and that t

- Display figures where there is
- Nothing appe

[ON] key.

• To replace th

1. Remove the hold the back and then re cover.
2. Remove
3. Wipe of tery wit it into the tive



Attempt to perform a function calculation using a value that exceeds the allowable input range.
Attempt to perform an illogical operation (division by zero, etc.).

Action
Check your input values and make sure they are all within the allowable ranges. Pay special attention to values in any memory areas you are using.

; ERROR

Cause
Capacity of the numeric stack or operator stack is exceeded.

Action
Simplify the calculation. The numeric stack has 10 levels and the operator stack has 24 levels.
Divide your calculation into two or more separate parts.

n ERROR

Cause
Attempt to perform an illegal mathematical operation.

Action
Press ◀ or ▶ to display the calculation with the cursor located at the location of the error. Make necessary corrections.

g ERROR

Cause
Improper use of argument

Action
Press ◀ or ▶ to display the location of the cause of the error and make required corrections.

Order of Operations

Calculations are performed in the following order of precedence.
1. Coordinate transformation: Pol (x, y), Rec (r, θ)
2. Type A functions:
With these functions, the value is entered and then the function key is pressed.
x^2, x^{-1}, $x!$, °′″
3. Powers and roots: x^y, $\sqrt[x]{}$
$a^b/_c$
4. Abbreviated multiplication format in front of π, memory name, or variable name: 2π, 5A, πA etc.
5. Type B functions:
With these functions, the function key is pressed and then the value is entered.
$\sqrt{}$, $\sqrt[3]{}$, log, ln, e^x, 10^x, sin, cos, tan, $\sin^{-1}$, $\cos^{-1}$, $\tan^{-1}$, sinh, cosh, tanh, $\sinh^{-1}$, $\cosh^{-1}$, $\tanh^{-1}$, (−)
6. Abbreviated multiplication format in front of Type B functions: 2√3, Alog2 etc.
7. Permutation and combination: nPr, nCr
8. ×, ÷
9. +, −

Operations of the same precedence are performed from right to left. e^{x}ln 120 → e^{x}{ln(√ 120)}
Other operations are performed from left to right.
Operations enclosed in parentheses are performed first.

Stacks

This calculator uses memory areas, called "stacks," to temporarily store values (numeric stack) and commands (command stack) according to their precedence during calculations. The numeric stack has 10 levels and the command stack has 24 levels. A stack error (Stk ERROR) occurs whenever you try to perform a calculation that is so complex that the capacity of a stack is exceeded.

Power Supply

The type of battery you should use depends on the model number of your calculator.

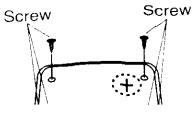
<fx-85W/fx-85WA/fx-300W/fx-911W>
The TWO WAY POWER system actually has two power supplies: a solar cell and a G13 Type (LR44) button battery. Normally, calculators equipped with a solar cell alone can operate only when relatively bright light is present. The TWO WAY POWER system, however, lets you continue to use the calculator as long as there is enough light to read the display.

Replacing the Battery

Either of the following symptoms indicates battery power is low, and that the battery should be replaced.
- Display figures are dim and difficult to read in areas where there is little light available.
- Nothing appears on the display when you press the ON key.

To replace the battery

1. Remove the six screws that hold the back cover in place and then remove the back cover.
2. Remove the old battery.
3. Wipe off the sides of new battery with a dry, soft cloth. Load



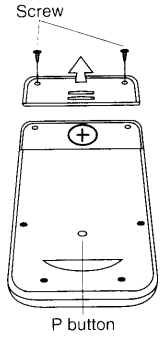
<fx-83WA/fx-270W PLUS/fx-350TL>
This calculator is powered by single G13 Type (LR44) button battery.

• Replacing the Battery

Dim figures on the display of the calculator indicate that battery power is low. Continued use of the calculator when the battery is low can result in improper operation. Replace the battery as soon as possible when display figures become dim.

• To replace the battery

1. Press OFF to turn power off.
2. Remove the two screws that hold the battery cover in place and then remove the battery cover.
3. Remove the old battery.
4. Wipe off the side of new battery with a dry, soft cloth. Load it into the unit with the positive ⊕ side facing up (so you can see it).
5. Replace the battery cover and secure it in place with the two screws.
6. Use a thin, pointed object to press the P button. Be sure not to skip this step.
7. Press AC/ON to turn power on.



• Auto Power Off

Calculator power automatically turns off if you do not perform any operation for about six minutes. When this happens, press AC/ON (fx-85W/fx-85WA/fx-300W/fx-911W: ON) to turn power back on.

■ Input Ranges

Internal digits: 12
Accuracy: As a rule, accuracy is ±1 at the 10th digit.

Functions	Input Range
sin$x$	DEG $0 \leqq \lvert x \rvert \leqq 4.499999999\times10^{10}$
	RAD $0 \leqq \lvert x \rvert \leqq 785398163.3$
	GRA $0 \leqq \lvert x \rvert \leqq 4.499999999\times10^{10}$
cos$x$	DEG $0 \leqq \lvert x \rvert \leqq 4.500000008\times10^{10}$
	RAD $0 \leqq \lvert x \rvert \leqq 785398164.9$
	GRA $0 \leqq \lvert x \rvert \leqq 5.000000009\times10^{10}$
tan$x$	DEG Same as sin$x$, except when $\lvert x \rvert = (2n-1)\times90$.
	RAD Same as sin$x$, except when $\lvert x \rvert = (2n-1)\times\pi/2$.
	GRA Same as sin$x$, except when $\lvert x \rvert = (2n-1)\times100$.
$\sin^{-1}x$	$0 \leqq \lvert x \rvert \leqq 1$
$\cos^{-1}x$	
$\tan^{-1}x$	$0 \leqq \lvert x \rvert \leqq 9.999999999\times10^{99}$
sinh$x$	$0 \leqq \lvert x \rvert \leqq 230.2585092$
cosh$x$	
$\sinh^{-1}x$	$0 \leqq \lvert x \rvert \leqq 4.999999999\times10^{99}$
$\cosh^{-1}x$	
tanh$x$	$0 \leqq \lvert x \rvert \leqq 9.999999999\times10^{-1}$
$\tanh^{-1}x$	
log$x$/ln$x$	$0 < x$
10^x	$-9.999999999\times10^{99} \leqq x \leqq 99.99999999$
e^x	$-9.999999999\times10^{99} \leqq x \leqq 230.2585092$
$\sqrt{x}$	$0 \leqq x < 1\times10^{100}$
x^2	$\lvert x \rvert < 1\times10^{50}$
$1/x$	$\lvert x \rvert < 1\times10^{100}$; $x \neq 0$
$\sqrt[3]{x}$	$\lvert x \rvert < 1\times10^{100}$
$x!$	$0 \leqq x \leqq 69$ (x is an integer)
nPr	$0 \leqq n \leqq 99$, $r \leqq n$ (n, r is an integer) $1 \leqq \{n!/(n-r)!\} \leqq 9.999999999\times10^{99}$
nCr	$0 \leqq n \leqq 99$, $r \leqq n$ (n, r is an integer)
Pol(x, y)	$\lvert x \rvert$, $\lvert y \rvert \leqq 9.999999999\times10^{49}$ $(x^2+y^2) \leqq 9.999999999\times10^{99}$
Rec(r, θ)	$0 \leqq r \leqq 9.999999999\times10^{99}$ θ: Same as sin$x$, cos$x$
$a^b/_c$	$\lvert a \rvert$, b, $c < 1\times10^{100}$ $0 \leqq b$, c
°′″	$\lvert x \rvert < 1\times10^{100}$ Decimal ↔ Sexagesimal C $0°0'0'' \leqq \lvert x \rvert \leqq 9999$
x^y	$x>0$: -1×10 $x=0$: $y>0$ $x<0$: $y=n$, $\frac{2n+1}{}$ However: -1×10
$\sqrt[x]{}$	$y>0$: $-1\times$

fx-83WA/fx-270W PLUS/fx-350TL:
Approximately 12,000 hours continuous display of flashing cursor.
Approximately 3 years when left with power turned off.

Dimensions:
fx-82TL: 19.3(H)×76(W)×164(D) mm
$^3/_4$"(H)×3"(W)×6$^7/_{16}$"(D)
fx-83WA/fx-85W/fx-85WA/fx-270W PLUS/fx-300W/fx-350TL/fx-911W:
10(H)×76(W)×150(D) mm
$^3/_8$"(H)×3"(W)×5$^7/_8$"(D)

Weight:
fx-82TL: 115 g (4.1 oz) including battery
fx-85W/fx-85WA/fx-300W/fx-911W:
80 g (2.8 oz) including battery
fx-83WA/fx-270W PLUS/fx-350TL:
90 g (3.2 oz) including battery

Power Consumption: 0.0001W

Operating Temperature: 0°C ~ 40°C (32°F ~ 104°F)

• Linear Regression

The regression formula for linear regression is: $y = A + Bx$.

• **Example:** Atmospheric Pressure vs. Temperature

Temperature	Atmospheric Pressure
10 C	1003 hPa
15 C	1005 hPa
20 C	1010 hPa
25 C	1011 hPa
30 C	1014 hPa

Perform linear regression to determine the regression formula terms and correlation coefficient for the data nearby. Next, use the regression formula to estimate atmospheric pressure at 18 C and temperature at 1000 hPa.

Enter REG Mode (Linear Regression)

fx-85W: [MODE] [MODE] [2] [1]
Other models: [MODE] [3] [1]
[SHIFT] [Scl] [=] (Memory Clear)

10 [,] 1003 [DT] 15 [,] 1005 [DT]
20 [,] 1010 [DT] 25 [,] 1011 [DT]
30 [,] 1014 [DT] → 30. REG

(Regression Coefficient A)	[SHIFT] [A] [=]	997.4
(Regression Coefficient B)	[SHIFT] [B] [=]	0.56
(Correlation Coefficient r)	[SHIFT] [r] [=]	0.982607368
(Atmospheric Pressure at 18 C)	18 [SHIFT] [$\hat{y}$]	1007.48
(Temperature at 1000 hPa)	1000 [SHIFT] [$\hat{x}$]	4.642857143

• Quadratic Regression

- The regression formula for quadratic regression is: $y = A + Bx + Cx^2$.
- Input data using the following key sequence.
  <x-data> [,] <y-data> [DT]

• **Example:**

x_i	y_i
29	1.6
50	23.5
74	38.0
103	46.4
118	48.0

Perform quadratic regression to determine the regression formula terms and correlation coefficient for the data nearby. Next, use the regression formula to estimate the values for $\hat{y}$ (estimated value of y) for $x_i = 16$ and $\hat{x}$ (estimated value of x) for $y_i = 20$.

Enter REG mode (Quadratic regression)

fx-85W: [MODE] [MODE] [2] [▶] [3]
Other models: [MODE] [3] [▶] [3]
[SHIFT] [Scl] [=]

29 [,] 1.6 [DT] 50 [,] 23.5 [DT]
74 [,] 38.0 [DT] 103 [,] 46.4 [DT]
118 [,] 48.0 [DT] → 118. REG

(Regression Coefficient A)	[SHIFT] [A] [=]	−35.59856934
(Regression Coefficient B)	[SHIFT] [B] [=]	1.495939413
(Regression Coefficient C)	[SHIFT] [C] [=]	−6.71629667^{-03}
($\hat{y}$ when $x_i = 16$)	16 [SHIFT] [$\hat{y}$]	−13.38291067
($\hat{x}$, when $y_i = 20$)	20 [SHIFT] [$\hat{x}$]	47.14556728
($\hat{x}$, when $y_i = 20$)	[SHIFT] [$\hat{x}$]	175.5872105

Data Input Precautions

- [DT] [DT] inputs the same data twice.
- You can also input multiple entries of the same data using [SHIFT] [;]. To input the data "20 and 30" five times, for example, press 20 [,] 30 [SHIFT] [;] 5 [DT].
- The above results can be obtained in any order, and not necessarily that shown above.
- To delete data you have just input, press [SHIFT] [CL].

Formula Memory (fx-85W)

- Formula memory lets you input a single formula in memory, and then input values for the formula's variables to calculate results.
- Memory can hold a single formula, up to 79 steps long. This function can be used in the COMP mode only.
- Note that the formula is actually stored in memory when you press the [CALC] key in the sequence below.

produce a binary result:

$10111_2 + 11010_2$
Binary mode [MODE] [2] [BIN] → 0.

10111$_2$ [+] 11010$_2$ → 0.

[=] → 110001.

• **Example 2:** To perform the following calculation and produce an octal result:

$7654_8 \div 12_{10}$
Octal mode [MODE] [2] [OCT] → 0.

[LOGIC] [LOGIC] [LOGIC] [4] (o) 7654_8 [÷]
[LOGIC] [LOGIC] [LOGIC] [1] (d)12_{10} → 0.

[=] → 516.

• **Example 3:** To perform the following calculation and produce a hexadecimal result:

120_{16} or 1101_2
Hexadecimal mode [MODE] [2] [HEX] → 0.

120_{16} [LOGIC] [2] (or)
[LOGIC] [LOGIC] [LOGIC] [3] (b)1101_2 → 0.

[=] → 12d.

Degrees, Minutes, Seconds Calculations

- You can perform sexagesimal calculations using degrees (hours), minutes, and seconds, and convert between sexagesimal and decimal values.

• **Example 1:** To convert the decimal value 2.258 to a sexagesimal value

2.258 [=] → 2.258
[SHIFT] [...] → 2°15°28.8

• **Example 2:** To perform the following calculation:

12°34'56" × 3.45
12 [...] 34 [...] 56 [...] [×] 3.45 → 0.
[=] → 43°24°31.2

Technical Information

■ When you have a problem.....

If calculation results are not what you expect or if an error occurs, perform the following steps.

1. [MODE] [1] (COMP mode)
2. fx-85W: [MODE] [MODE] [MODE] [1] (DEG mode)
   Other models: [MODE] [MODE] [1]
3. fx-85W: [MODE] [MODE] [MODE] [MODE] [3] [1] (NORM 1 mode)
   Other models: [MODE] [MODE] [MODE] [3] [1]
4. Check the formula you are working with to confirm it is correct.
5. Enter the correct modes to perform the calculation and try again.

<fx-82TL/fx-83WA/fx-270W PLUS/fx-350TL>
If the above steps do not correct your problem, press the P button on the back of the calculator to reset it. Pressing the P button deletes all data stored in calculator memory. Make sure you always keep written copies of all important data.

<fx-85W/fx-85WA/fx-300W/fx-911W>
If the above steps do not correct the problem, press the [ON] key. The calculator performs a self-check operation and deletes all data stored in memory if any abnormality is detected. Make sure you always keep written copies of all important data.

■ Error Messages

The calculator is locked up while an error message is on the display. Press [AC] to clear the error, or press [◀] or [▶] to display the calculation and correct the problem. See "Error Locator" for details.

Ma ERROR

- **Cause**
  - Calculation result is outside the allowable calculation range.

tan^{-1}, sinh, cosh, tanh, sinh^{-1}, cosh^{-1}, tanh^{-1}
7 Abbreviated multiplication format in front of functions: 2 sin 3, 4log2 etc.
8 Permutation and combination: nPr, nCr
9 ×, ÷
10 +, −

- Operations of the same precedence are performed right to left. $e^{\ln 120} \rightarrow e^{(\ln(\quad 120)}$
  Other operations are performed from left to right.
- Operations enclosed in parentheses are performed

■ Stacks

This calculator uses memory areas, called "stacks," porarily store values (numeric stack) and command mand stack) according to their precedence during lations. The numeric stack has 10 levels and the co stack has 24 levels. A stack error (Stk ERROR) whenever you try to perform a calculation that is s plex that the capacity of a stack is exceeded.

■ Power Supply

The type of battery you should use depends on the number of your calculator.

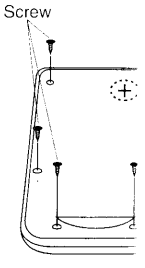
<fx-85W/fx-85WA/fx-300W/fx-911W>
The TWO WAY POWER system actually has two supplies: a solar cell and a G13 Type (LR44) butt tery. Normally, calculators equipped with a solar ce can operate only when relatively bright light is p The TWO WAY POWER system, however, lets yo tinue to use the calculator as long as there is enou to read the display.

• Replacing the Battery

Either of the following symptoms indicates battery is low, and that the battery should be replaced.
- Display figures are dim and difficult to read in where there is little light available.
- Nothing appears on the display when you pres [ON] key.

• To replace the battery

1 Remove the six screws that hold the back cover in place and then remove the back cover.
2 Remove the old battery.
3 Wipe off the sides of new battery with a dry, soft cloth. Load it into the unit with the positive ⊕ side facing up (so you can see it).
4 Replace the back cover and secure it in place with the six screws.
5 Press [ON] to turn power on. Be sure not to skip this step.



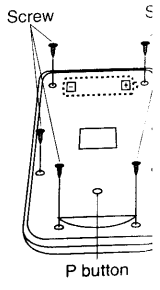
<fx-82TL>
This calculator is powered by single AA-size batter

• Replacing the Battery

Dim figures on the display of the calculator indica battery power is low. Continued use of the calc when the battery is low can result in improper ope Replace the battery as soon as possible when figures become dim.

• To replace the battery

1 Press [OFF] to turn power off.
2 Remove the six screws that hold the back cover in place and then remove the back cover.
3 Remove the old battery.
4 Load a new battery into the unit so it's positive ⊕ and negative ⊖ sides are facing correctly.
5 Replace the back cover and secure it in place with the six screws.
6 Use a thin, pointed object to press the P button. Be sure not to skip this step.
7 Press [ON] to turn power on.



, log, ln, e^x, 10^x, sin, cos, tan, $\sin^{-1}$, $\cos^{-1}$, $\tan^{-1}$, sinh, cosh, tanh, $\sinh^{-1}$, $\cosh^{-1}$, $\tanh^{-1}$, (−)
Abbreviated multiplication format in front of Type B functions: 2 3, Alog2 etc.
Permutation and combination: $_nP_r$, $_nC_r$
x
÷

Operations of the same precedence are performed from right to left. $e^{\ln}$ 120 $e^{\{\ln(}$ 120)}
Other operations are performed from left to right.
Operations enclosed in parentheses are performed first.

Stacks

calculator uses memory areas, called "stacks," to temrily store values (numeric stack) and commands (comd stack) according to their precedence during calcuns. The numeric stack has 10 levels and the command k has 24 levels. A stack error (Stk ERROR) occurs never you try to perform a calculation that is so com- that the capacity of a stack is exceeded.

Power Supply

type of battery you should use depends on the model ber of your calculator.

-85W/fx-85WA/fx-300W/fx-911W>

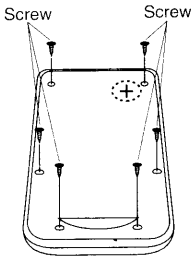
TWO WAY POWER system actually has two power plies: a solar cell and a G13 Type (LR44) button bat- Normally, calculators equipped with a solar cell alone operate only when relatively bright light is present. TWO WAY POWER system, however, lets you con- e to use the calculator as long as there is enough light ead the display.

eplacing the Battery

ther of the following symptoms indicates battery power low, and that the battery should be replaced.
Display figures are dim and difficult to read in areas where there is little light available.
Nothing appears on the display when you press the ON key.

o replace the battery

Remove the six screws that old the back cover in place and then remove the cover.



Remove the old battery.
Wipe off the sides of new battery with a dry, soft cloth. Load into the unit with the positive ⊕ side facing up (so you can see it).
Replace the back cover and secure it in place with the six screws.
Press ON to turn power on. Be sure not to skip this step.

-82TL>

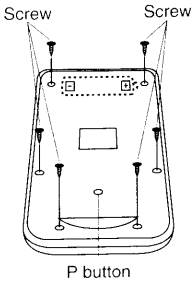
s calculator is powered by single AA-size battery.

eplacing the Battery

m figures on the display of the calculator indicate that attery power is low. Continued use of the calculator nen the battery is low can result in improper operation. eplace the battery as soon as possible when display gures become dim.

o replace the battery

Press OFF to turn power off.
Remove the six screws that nold the back cover in place and then remove the back cover.



Remove the old battery.
Load a new battery into the unit so it's positive ⊕ and negative ⊖ sides are facing correctly.
Replace the back cover and secure it in place with the six screws.
Use a thin, pointed object to press the P button. Be sure not to skip this step.

P button

Press AC/ON to turn power on.

	RAD $0 \leqq \lvert x \rvert \leqq 785398164.9$
	GRA $0 \leqq \lvert x \rvert \leqq 5.000000009 \times 10^{10}$
$\tan x$	DEG Same as $\sin x$, except when $\lvert x \rvert = (2n-1) \times 90$.
	RAD Same as $\sin x$, except when $\lvert x \rvert = (2n-1) \times \pi/2$.
	GRA Same as $\sin x$, except when $\lvert x \rvert = (2n-1) \times 100$.
$\sin^{-1} x$	$0 \leqq \lvert x \rvert \leqq 1$
$\cos^{-1} x$	
$\tan^{-1} x$	$0 \leqq \lvert x \rvert \leqq 9.999999999 \times 10^{99}$
$\sinh x$	$0 \leqq \lvert x \rvert \leqq 230.2585092$
$\cosh x$	
$\sinh^{-1} x$	$0 \leqq \lvert x \rvert \leqq 4.999999999 \times 10^{99}$
$\cosh^{-1} x$	
$\tanh x$	$0 \leqq \lvert x \rvert \leqq 9.999999999 \times 10^{-1}$
$\tanh^{-1} x$	
$\log x / \ln x$	$0 < x$
10^x	$-9.999999999 \times 10^{99} \leqq x \leqq 99.99999999$
e^x	$-9.999999999 \times 10^{99} \leqq x \leqq 230.2585092$
$\sqrt{x}$	$0 \leqq x < 1 \times 10^{100}$
x^2	$\lvert x \rvert < 1 \times 10^{50}$
$1/x$	$\lvert x \rvert < 1 \times 10^{100}$; $x \neq 0$
$\sqrt[3]{x}$	$\lvert x \rvert < 1 \times 10^{100}$
$x!$	$0 \leqq x \leqq 69$ (x is an integer)
$_nP_r$	$0 \leqq n \leqq 99$, $r \leqq n$ (n, r is an integer) $1 \leqq \{n!/(n-r)!\} \leqq 9.999999999 \times 10^{99}$
$_nC_r$	$0 \leqq n \leqq 99$, $r \leqq n$ (n, r is an integer)
Pol(x, y)	$\lvert x \rvert$, $\lvert y \rvert \leqq 9.999999999 \times 10^{49}$ $(x^2+y^2) \leqq 9.999999999 \times 10^{99}$
Rec(r, θ)	$0 \leqq r \leqq 9.999999999 \times 10^{99}$ θ: Same as $\sin x$, $\cos x$
$\circ\,'\,''$	$\lvert a \rvert$, b, $c < 1 \times 10^{100}$ $0 \leqq b$, c
$\circ\,'\,''$	$\lvert x \rvert < 1 \times 10^{100}$ Decimal ↔ Sexagesimal Conversions $0^\circ 0' 0'' \leqq \lvert x \rvert \leqq 999999^\circ 59' 59''$
x^y	$x>0$: $-1 \times 10^{100} < y \log x < 100$ $x=0$: $y>0$ $x<0$: $y = n, \frac{1}{2n+1}$ (n is an integer) However: $-1 \times 10^{100} < y \log \lvert x \rvert < 100$
$\sqrt[x]{y}$	$y>0$: $x \neq 0$ $-1 \times 10^{100} < 1/x \log y < 100$ $y=0$: $x>0$ $y<0$: $x = 2n+1, \frac{1}{n}$ ($n \neq 0$; n is an integer) However: $-1 \times 10^{100} < 1/x \log \lvert y \rvert < 100$
$a\,b/c$	Total of integer, numerator, and denominator must be 10 digits or less (including division marks).
SD (REG)	$\lvert x \rvert < 1 \times 10^{50}$ $\lvert y \rvert < 1 \times 10^{50}$ $\lvert n \rvert < 1 \times 10^{100}$ $x\sigma_n$, $y\sigma_n$, $\bar{x}$, $\bar{y}$ A, B, r : $n \neq 0$ $x\sigma_{n-1}$, $y\sigma_{n-1}$: $n \neq 0, 1$

* Erros are cumulative with such internal continuous calculations as x^2, $\sqrt{\ }$, $x!$, and $\sqrt[3]{\ }$, so accuracy may be adversely affected.

Specifications

Power Supply:
fx-82TL: Single AA-size battery (R6P (SUM-3))
fx-85W/fx-85WA/fx-300W/fx-911W:
Solar cell and a single G13 Type button battery (LR44)
fx-83WA/fx-270W PLUS/fx-350TL:
Single G13 Type button battery (LR44)

Battery Life:
fx-82TL: Approximately 17,000 hours continuous display of flashing cursor.
Approximately 2 years when left with power turned off.
fx-85W/fx-85WA/fx-300W/fx-911W:
Approximately 3 years (1 hour use per day).

CE
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